BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-027229

(43)Date of publication of application : 30.01.2001

(51)Int.Cl. F16C 17/10
F16C 33/20
F16C 33/74

(21)Application number : 11-202356

(22)Date of filing : 15.07.1999

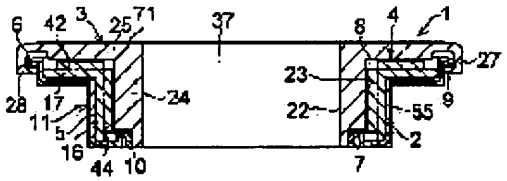
(71)Applicant : OILES IND CO LTD

(72)Inventor : UENO ATSUSHI
MIYATA KAZUYUKI

(54) SLIDING BEARING MADE OF SYNTHETIC RESIN

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a sliding bearing made of synthetic resin, capable of maintaining smooth steering during steering operation over a long period of time without lowering a sliding characteristic caused by the entry of dust or the like by positively preventing the entry of dust or the like to a sliding surface by a sealing means, and mounting the sealing means so as not to easily fall due to vibration or the like.



SOLUTION: This sliding bearing 1 made of synthetic resin is provided with a lower case 2 made of synthetic resin, an upper case 3 made of synthetic resin and placed over the lower case 2, a sliding bearing means 4 made of synthetic resin and disposed in a space 8 between the upper and lower cases 3, 2, and an elastic sealing means 11 disposed covering an outer surface 5 of the lower case 2 and closing the outside of the space 8 and inner annular openings 9, 10 between the upper and lower cases 3, 2 at both annular end parts 6, 7.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] Plain bearing possessing a plain-bearing means made of synthetic resin allotted between lower housing made of synthetic resin, upper housing made of synthetic resin put on this lower housing, and the upper part and lower housing, and an elastic seal means which covers external surface of lower housing, is allotted and blockaded an outside and inside annular opening of space between the lower part and upper housing at the edge annular [both] made of synthetic resin.
[Claim 2] An outside body characterized by providing the following is provided. An elastic seal means The main part section which covered an annular end face connected [peripheral face / of a cylinder part / of lower housing / a peripheral face and this peripheral face / an annular end-face list it connects / end face] at the annular Itabe's first annular lateral surface and this annular lateral surface, Plain bearing possessing the inside elastic lip section which is formed in the outside end section of this main part section in one, is formed in the outside elastic lip section which blockades an outside annular opening, and the inside end section of the main part section in one, and blockades an inside annular opening made of synthetic resin according to claim 1 Lower housing is a cylinder part with cylinder-like inner skin. the first annular Itabe formed in the end section of this cylinder part in one -- having -- **** -- upper housing -- inner skin of a cylinder part of lower housing -- said -- an inside body which has **** inner skin and a **** peripheral face, and was allotted in a cylinder part of lower housing Second annular Itabe formed in the end section of this inside body in one it forms in this second annular Itabe's annular periphery edge in one -- having -- **** -- inner skin of a cylinder part of lower housing -- said -- **** inner skin
[Claim 3] A plain-bearing means is plain bearing equipped with thrust plain bearing allotted between the first annular Itabe of lower housing, and the second annular Itabe of upper housing, and radial plain bearing allotted between a cylinder part of lower housing, and an inside body of upper housing made of synthetic resin according to claim 2.
[Claim 4] It is plain bearing made of synthetic resin according to claim 2 or 3 with which the inside elastic lip section touches an inside body of upper housing elastically in the annular inside end section by the outside elastic lip section's being the annular outside end section, and being elastically in contact with an outside body of upper housing.
[Claim 5] It is plain bearing made of synthetic resin given in any 1 term of claims 2-4 which the main part section possesses a core bar member in an elastic seal means, and each of an outside and the inside elastic lip section becomes from elastic material.
[Claim 6] It is plain bearing made of synthetic resin according to claim 5 which a core bar member covers the annular Itabe's first annular lateral surface and annular end face in a peripheral face and an annular end-face list of a cylinder part of lower housing, is extended in them, and is covered by elastic material, and each elastic material of an outside and the inside elastic lip section is extended from elastic material which covered a core bar member, and is in one with the elastic material concerned.
[Claim 7] A plain-bearing means is plain bearing made of synthetic resin given in any 1 term of claims 1-6 currently formed in either [at least] lower housing or upper housing in one.

[Claim 8] A plain-bearing means is plain bearing made of synthetic resin given in any 1 term of claims 1-6 currently formed in another object to lower housing and upper housing.
[Claim 9] Plain bearing made of synthetic resin given in any 1 term of claims 1-8 by which eye a grease sump is formed in a plain-bearing means.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] About plain bearing made of synthetic resin, in more detail, this invention is included in the strut type suspension (MAKUFASO type) in a four-wheel car, and relates to suitable plain bearing made of synthetic resin.
[0002]
[Problem(s) to be Solved by the Invention] The strut type suspension used for the front wheel of a four-wheel car has the structure which combined the coil spring with the strut assembly which generally built in the hydraulic shock absorber in the outer case which became one-like with the main shaft. In this Sas ** NSHON, in case a strut assembly turns with a coil spring in steering actuation, there is a thing of the format around which the piston rod of a strut assembly turns, and the format around which a piston rod does not turn, but between the attachment member of the body, and the up spring seat sheet of a coil spring, it rolls, it replaces with a ball bearing and plain bearing made of synthetic resin may be used in order to permit rotation of a strut assembly smoothly also in which format.
[0003] Although plain bearing made of synthetic resin usually possesses the lower housing made of synthetic resin, and the upper housing made of synthetic resin put on this lower housing and comes to allot a plain-bearing member or a plain-bearing projected part to the space between these lower housing and upper housing, when dust, muddy water, etc. trespass upon this space, it has a possibility that a desired bearing function may no longer be obtained. On the other hand, since the part which carries out a direct action is equipped with dust, muddy water, etc. during vehicle transit, a strut type suspension becomes what also has the very severe operating environment of plain bearing with which it is equipped between the attachment member of the body, and the up spring seat sheet of a coil spring. Therefore, if the periphery [of the space where the plain-bearing member or the plain-bearing projected part was allotted], and inner circumference side is carrying out the opening outside directly, the risk of invasion to space, such as dust from here and muddy water, will become very high, and sealing performance here will become very important. In order to prevent stagnation of the moisture in space etc. especially, in plain bearing made of synthetic resin which was made to carry out the opening of the inner circumference side of space caudad, and formed lower housing and upper housing, the above-mentioned risk becomes still higher.
[0004] In addition, easily, since parts where vibration is very intense, such as a front wheel of an automobile, are equipped with plain bearing made of synthetic resin as mentioned above, from a seal means to blockade opening of the space concerned in order to prevent invasion to space, such as dust and muddy water, it is required by vibration etc. that opening of space should be firmly equipped with it so that there may be no dedropping.
[0005] This invention is made in view of said many points. With a seal means Can prevent invasion of the dust to a sliding surface etc. certainly, do not produce the fall of the sliding property resulting from invasion of dust etc., and, moreover, it ** by vibration etc. by the ability equipping with a seal means easily, so that there may be no dedropping. It aims at obtaining plain bearing made of synthetic resin

which can maintain smooth steering at the time of steering actuation over a long period of time.
[0006]
[Means for Solving the Problem] Plain bearing made of synthetic resin of the first mode of this invention possesses a plain-bearing means made of synthetic resin allotted between lower housing made of synthetic resin, upper housing made of synthetic resin put on this lower housing, and the upper part and lower housing, and an elastic seal means which covers external surface of lower housing, is allotted and blockaded an outside and inside annular opening of space between the lower part and upper housing at the edge annular [both].
[0007] Since according to plain bearing of the first mode an elastic seal means to blockade an outside and inside annular opening of space between the upper part and lower housing covers a peripheral face of lower housing and is allotted at the edge annular [both] If plain bearing is attached between an attachment member of the body, and an up spring seat sheet of a coil spring As a result of fixing an elastic seal means to a washer installed on an up spring seat sheet or an up spring seat sheet firmly, omission of an elastic seal means can be prevented certainly. Moreover, with the elastic seal means concerned Invasion of dust to a sliding surface etc. can be prevented certainly, it produces a fall of a sliding property resulting from invasion of dust etc. and **, and smooth steering at the time of steering actuation can be maintained over a long period of time.
[0008] In plain bearing made of synthetic resin of the second mode of this invention In plain bearing of the first mode lower housing It has a cylinder part with cylinder-like inner skin, and the first annular Itabe formed in the end section of this cylinder part in one. Upper housing inner skin of a cylinder part of lower housing -- said -- it having **** inner skin and a **** peripheral face, and with an inside body allotted in a cylinder part of lower housing It is formed in an annular periphery edge of the second annular Itabe formed in the end section of this inside body in one, and this second annular Itabe in one. An outside body with **** inner skin is provided. inner skin of a cylinder part of lower housing -- said -- an elastic seal means The main part section which covered an annular end face connected [peripheral face / of a cylinder part / of lower housing / a peripheral face and this peripheral face / an annular end-face list it connects / end face] at the annular Itabe's first annular lateral surface and this annular lateral surface, It is formed in the outside end section of this main part section in one, and it is formed in the outside elastic lip section which blockades an outside annular opening, and the inside end section of the main part section in one, and the inside elastic lip section which blockades an inside annular opening is provided.
[0009] Since the inside of the main part section which covered the annular Itabe's first annular lateral surface and annular end face in a peripheral face and an annular end-face list of a cylinder part of lower housing, the inside annular in the outside end section, and the outside elastic lip section are formed according to plain bearing of the second mode, seal of an outside and inside annular opening can be made nearly perfect by elastic contact to this inside, the inside of upper housing of the outside elastic lip section, and an outside body.
[0010] In plain bearing made of synthetic resin of the third mode of this invention, a plain-bearing means is equipped with thrust plain bearing allotted between the first annular Itabe of lower housing, and the second annular Itabe of upper housing, and radial plain bearing allotted between a cylinder part of lower housing, and an inside body of upper housing in plain bearing of the second mode.
[0011] In plain bearing of the third mode thrust plain bearing Even if it forms in either [at least] the first annular Itabe or the second annular Itabe in one It may replace with this and you may form in another object at least to one side of them, and similarly, even if it also forms radial plain bearing in either [at least] a cylinder part or the inside bodies in one, it may be replaced with this and may be formed in another object at least to one side of them.
[0012] By plain bearing made of synthetic resin of the fourth mode of this invention, in plain bearing of the second or third mode, the outside elastic lip section is the annular outside end section, it is elastically in contact with an outside body of upper housing, and the inside elastic lip section touches an inside body of upper housing elastically in the annular inside end section.
[0013] In plain bearing made of synthetic resin of the fifth mode of this invention, in plain bearing of the

second to fourth one of modes, the main part section of an elastic seal means possesses a core bar member, and an outside of an elastic seal means and each of the inside elastic lip section consist of elastic material.

[0014] In plain bearing of the fifth mode, a core bar member covers the annular Itabe's first annular lateral surface and annular end face in a peripheral face and an annular end-face list of a cylinder part of lower housing, is extended in them, and it is covered with plain bearing made of synthetic resin of the sixth mode of this invention by elastic material, and each elastic material of an outside and the inside elastic lip section is extended from elastic material which covered a core bar member, and is in one with the elastic material concerned.

[0015] In plain bearing of the fifth mode of this invention, an elastic seal means possesses a core bar member, and an outside and the inside elastic lip section consist of elastic material. In plain bearing of the sixth mode Since it consists of elastic material extended in one from elastic material with which a core bar member which covered external surface of lower housing was covered with elastic material, and each of an outside and the inside elastic lip section covered a core bar member It can arrange without giving an elastic seal means to external surface of lower housing, and seal of an outside and inside annular opening can be attained nearly completely as an outside which consists of elastic material, and the inside elastic lip section are moreover also. As elastic material, plastics elastomers, such as rubber elasticity objects, such as natural rubber and synthetic rubber, or polyester, and polyurethane, are used.

[0016] Even if it forms a plain-bearing means in either [at least] lower housing or upper housing in one and forms it in it like plain bearing of the seventh mode in this invention You may form and prepare in another object to lower housing and upper housing like plain bearing of the eighth mode. Here When it constitutes a plain-bearing means from thrust plain bearing and radial plain bearing, like the third mode, in one, these may also be formed in formation or another object, and may be prepared in either [at least] lower housing or upper housing. Furthermore, for a plain-bearing means, like plain bearing of the ninth mode, eye a grease sump may be formed, if grease is arranged and used for eye this grease sump, it can continue and the further smooth steering at the time of steering actuation can be obtained at a long period of time.

[0017] As for synthetic resin which constitutes the upper part and lower housing in this invention, it is desirable to excel in a sliding property and mechanical properties, such as abrasion resistance, shock resistance, and creep resistance, as for especially synthetic resin that constitutes a plain-bearing means allotted between the upper part and lower housing, it is desirable to have self-lubricity, polyolefin resin, such as polyester resin, such as polyacetal resin, polyamide resin, and polybutylene terephthalate (PBT), polyethylene, and polypropylene, etc. is used good, in addition polycarbonate resin etc. can be used.

[0018] Although synthetic resin which constitutes a plain-bearing means, and same synthetic resin may be used for the upper part and lower housing, it is the combination with good synthetic resin and friction property used especially for a plain-bearing means, and it is moreover comparatively desirable that it is rigid high synthetic resin. When it illustrates about the desirable combination, there are combination of polyacetal and a polyamide, combination of polyethylene and polyacetal, combination of polyacetal and PBT, and combination of polyacetal and polyacetal to a plain-bearing means, the upper part, and lower housing.

[0019] In addition, a labyrinth seal means may be further formed at least in one side of an outside and inside annular opening, and one [at least] sealing performance by the side of a periphery and inner circumference may be further raised by in collaboration with this labyrinth seal means and an elastic seal means.

[0020] Next, this invention is further explained to details based on an example of a gestalt of desirable operation shown in drawing. This invention is not limited to these examples at all.

[0021]

[Embodiment of the Invention] In drawing 4 from drawing 1 the plain bearing 1 made of the synthetic resin of this example The lower housing 2 made of synthetic resin, and the upper housing 3 made of synthetic resin put on lower housing 2, The plain-bearing means 4 made of synthetic resin allotted to the

upper part, lower housing 2, and the space 8 between three, The external surface 5 of lower housing 2 is covered, it is allotted, and the elastic seal means 11 which blockaded the outside and inside annular openings 9 and 10 of space 8 between the upper part, lower housing 2, and 3 at the edges 6 and 7 annular [both] is provided.

[0022] Lower housing is equipped with the cylinder part 16 with the inner skin 15 of the shape of 2 and a cylinder, and annular Itabe 17 formed in the end section of a cylinder part 16 in one.

[0023] It has **** inner skin 22 and a **** peripheral face 23. upper housing 3 -- the inner skin 15 of the cylinder part 16 of lower housing 2 -- said -- With the inside body 24 allotted in the cylinder part 16 of lower housing 2, and annular Itabe 25 formed in the end section of the inside body 24 in one it forms in annular Itabe's 25 annular periphery section in one -- having -- **** -- the inner skin 15 of the cylinder part 16 of lower housing 2 -- said -- it has the outside body 27 with the **** inner skin 26, and the annular projection 28 which projected to the method of the inside of the direction of a path, and was formed in the inner skin 26 of the outside body 27 in one.

[0024] The inside body 24 consists of the thick-cylinder section 31 and the thin cylinder section 32, and a peripheral face 23 consists of a peripheral face 33 of the thick-cylinder section 31, and a peripheral face 34 of the thin cylinder section 32. The inner skin 22 of the inside body 24 has specified the insertion hole 37 with which the piston rod 36 of a strut assembly shown in drawing 5 is inserted.

[0025] The annular thrust plain bearing 42 which the plain-bearing means 4 was allotted between annular Itabe 17 of lower housing 2, and annular Itabe 25 of upper housing 3, and projected to shaft orientations and was formed in annular Itabe's 17 annular medial surface 41 in one, It is allotted between the cylinder part 16 of lower housing 2, and the inside body 24 of upper housing 3. It has the radial plain bearing 44 of the shape of a cylinder which projected to the direction inboard of a path and was formed in the inner skin 15 of a cylinder part 16 in one. The protrusion circumferentia 45 of the thrust plain bearing 42 It is in contact so that sliding of one annular side (annular inside) 46 of annular Itabe 25 may be attained, and the protrusion cylinder side 47 of the shape of a cylinder of the radial plain bearing 44 touches so that sliding may become free at the peripheral face 33 of the shape of a cylinder of the thick-cylinder section 31.

[0026] in the plain-bearing means 4, two or more slots 48 as [are extended in the radiation direction to the protrusion circumferentia 45] a grease sump are extended to shaft orientations in the protrusion cylinder side 47 -- similarly two or more slots 49 as a grease sump are formed in the angle direction at equal intervals, respectively.

[0027] The main part section 55 which covered the annular end face 54 which connects [peripheral face / of a cylinder part 16 / cylinder-like / of lower housing 2 / the peripheral face 51 and peripheral face 51 / the annular end-face it connects / end face / 52 list] the elastic seal means 11 at annular Itabe's 17 annular lateral surface 53 and annular lateral surface 53, Are turned up from the annular outside end section 56 of the main part section 55, and expand the diameter gradually and it is extended so that the outside annular opening 9 may be blockaded. The tip 57 which is the annular outside end section touches the inner skin 26 of the outside body 27 elastically. So that it may be the main part section 55 and the same axle, may be formed in the outside end section 56 of the main part section 55 in one and the inside annular opening 10 may be blockaded with the annular outside elastic lip section 58 which constitutes the annular edge 6 Are turned up from the annular inside end section 59 of the main part section 55, and reduce the diameter gradually and it is extended. It is elastically in contact with the peripheral face 34 of the thin cylinder section 32, and the tips 60 which are the annular inside end section are the main part section 55 and the same axle, are formed in the inside end section 59 of the main part section 55 in one, and the annular inside elastic lip section 61 which constitutes the annular edge 7 is provided.

[0028] In the elastic seal means 11 the main part section 55 The elastic material 66 which consists of the core bar member 65, rubber, or a plastics elastomer is provided. An outside and the inside elastic lip sections 58 and 61 It consists of elastic material which consists of rubber or a plastics elastomer. The core bar member 65 Cover annular Itabe's 17 annular lateral surface 53 and annular end face 54 in the peripheral face 51 and annular end-face 52 list of a cylinder part 16 which are the external surface 5 of

lower housing 2, and contact these and it is extended. It is covered by the elastic material 66, and the elastic material of an outside and the inside elastic lip sections 58 and 61 is extended from the elastic material 66 which covered the core bar member 66, and is in one with the elastic material 66 concerned. Each of an outside and the inside elastic lip sections 58 and 61 is formed so that it may become heavy-gage, as it goes at a tip.

[0029] The piston rod 36 of the shock absorber in a strut assembly is made to insert in the insertion hole 37, as the plain bearing 1 made of the above synthetic resin is shown in drawing 5 . The upper surface 71 of upper housing 3 is made to contact exactly the attachment member 72 by the side of the body attached in the end of a piston rod 36. The cylindrical external surface 73 and the annular external surface 74 of the elastic seal means 11 are made to contact exactly the up spring seat sheet 76 of the coil spring 75 in a strut assembly through a washer 77, and it is equipped between the attachment member 72 and the up spring seat sheet 76, and is used.

[0030] If a strut assembly rotates by steering actuation, this rotation of lower housing 2 will be smoothly made by lower housing 2 rotating to upper housing 3 by the thrust plain bearing 42 and the radial plain bearing 44 which were allotted between the upper part, lower housing 3, and 2, therefore steering actuation will also be performed without resistance. Moreover, invasion of the dust through the outside and inside annular openings 9 and 10 to space 8 between the upper part, lower housing 3, and 2 etc. It is prevented in a periphery side by the outside elastic lip section 58, and is prevented by the inside elastic lip section 61 in an inner circumference side. It ** and invasion of the dust of between the protrusion circumferentia 45 and the sides 46 which it is between each sliding surface of the thrust plain bearing 42 and the radial plain bearing 44, and a between [the protrusion cylinder side 47 and peripheral faces 33] etc. is prevented certainly.

[0031] Namely, according to the plain bearing 1 made of synthetic resin Since an elastic seal means 11 to blockade the outside and inside annular openings 9 and 10 of space 8 between the upper part, lower housing 3, and 2 covers the peripheral face 51 which is the external surface 5 of lower housing 2, the annular end face 52, the annular lateral surface 53, and the annular end face 54 and is allotted at the edges 6 and 7 annular [both] If plain bearing 1 is attached between the attachment member 72 of the body, and the up spring seat sheet 76 of a coil spring 75 As a result of fixing the elastic seal means 11 to the washer 77 installed on the up spring seat sheet 76 or the up spring seat sheet 76 firmly, omission of the elastic seal means 11 can be prevented certainly. Moreover, with the seal means 11 concerned Invasion of the dust of between the protrusion circumferentia 45 and the sides 46 in the thrust plain bearing 42 and the radial plain bearing 44 and a between [the protrusion cylinder side 47 and peripheral faces 33] etc. can be prevented certainly. It produces the fall of the sliding property resulting from invasion of dust etc. and **, and smooth steering at the time of steering actuation can be maintained over a long period of time.

[0032] Moreover, since the annular inside and the outside elastic lip sections 61 and 58 are formed in the inside of the main part section 55 and the outside end sections 59 and 56 which covered annular Itabe's 17 annular lateral surface 53 and annular end face 54 in the peripheral face 51 and annular end-face 52 list of a cylinder part 16 according to plain bearing 1 By elastic contact to the inside, the inside of the upper housing 3 of the outside elastic lip sections 61 and 58, and the outside bodies 24 and 27, seal of the inside and outside annular openings 10 and 9 can be made nearly perfect.

[0033] In addition, in plain bearing 1, the elastic seal means 11 possesses the core bar member 65. An outside and the inside elastic lip sections 58 and 61 consist of elastic material, and the core bar member 65 which covered the external surface 5 of lower housing 2 is covered with the elastic material 66. Since an outside and the inside elastic lip sections 58 and 61 consist of elastic material extended in one from the elastic material 66 which covered the core bar member 65 It can arrange without hanging down the elastic seal means 11 from the external surface 5 of lower housing 2, and seal can be attained nearly completely as the outside which consists of elastic material, and the inside elastic lip sections 58 and 61 are moreover also. Furthermore, in plain bearing 1, since the slots 48 and 49 as a grease sump are formed, if grease is arranged and used for slots 48 and 49, it can continue and the further smooth steering at the time of steering actuation can be obtained at a long period of time.

[0034] By the way, in the above-mentioned plain bearing 1, although the plain-bearing means 4 was formed in lower housing 2 in one, it may replace with this, and as shown in drawing 6 and drawing 7 , the plain-bearing means 4 may be formed in another object to lower housing 2 and upper housing 3. The plain bearing 1 shown in drawing 6 and drawing 7 possesses the plain-bearing means 4 formed in another object to lower housing 2 and upper housing 3. Namely, the bearing means 4 made of synthetic resin The annular thrust plain-bearing section 81 used as thrust plain bearing and the radial plain-bearing section 82 of the shape of a cylinder used as radial plain bearing formed in the thrust plain-bearing section 81 in one are provided. In one annular side 83 of the thrust plain-bearing section 81 A slot 46, two or more same slots 84, and the annular slot 85 that opened the end of a slot 84 for free passage, respectively are formed. The same slot 84 also as the annular side 86 of another side of the thrust plain-bearing section 81, The annular slot 85 which opened the end of a slot 84 for free passage, respectively is formed. To the inside-and-outside peripheral surfaces 87 and 88 of the radial plain-bearing section 82 A slot 49 and two or more same slots 89 and 90 are formed. The plain-bearing means 4 It contacts so that the side 83 of the thrust plain-bearing section 81 may be slid on the side 86 of the thrust plain-bearing section 81 to annular Itabe's 17 annular medial surface 41, respectively on annular Itabe's 25 side 46. The inner skin 87 of the radial plain-bearing section 82 contacts the peripheral face 33 of the thick-cylinder section 31 so that the peripheral face 88 of the radial plain-bearing section 82 may be slid to the inner skin 15 of a cylinder part 16, respectively, and it is allotted to it in the space 8 between lower housing 2 and upper housing 3.

[0035] Also by the plain bearing 1 possessing the plain-bearing means 4 as shown in drawing 6 and drawing 7 , the same effect as the plain bearing 1 shown by drawing 4 can be acquired from drawing 1 .

[0036]

[Effect of the Invention] According to this invention, with a seal means, invasion of the dust to a sliding surface etc. can be prevented certainly, the fall of the sliding property resulting from invasion of dust etc. is not produced, moreover, it ** by the ability equipping with a seal means easily, by vibration etc., so that there may be no dedropping, and plain bearing made of synthetic resin which can maintain smooth steering at the time of steering actuation over a long period of time can be offered.

[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2001－27229
（P2001－27229A）
(43)公開日　平成13年１月30日(2001.1.30)

(51)Int.Cl.⁷	識別記号	Ｆ Ｉ		テーマコード（参考）
Ｆ１６Ｃ　17/10		Ｆ１６Ｃ　17/10	Ｚ	３Ｊ０１１
33/20		33/20	Ｚ	３Ｊ０１６
33/74		33/74	Ｚ	

審査請求　未請求　請求項の数９　ＯＬ　（全７頁）

(21)出願番号　特願平11－202356

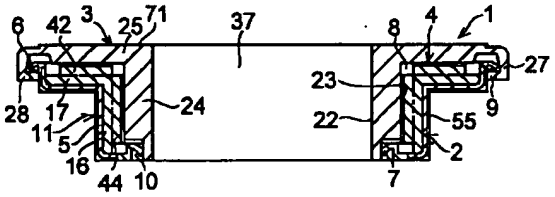
(22)出願日　平成11年７月15日(1999.7.15)

(71)出願人　000103644
オイレス工業株式会社
東京都港区芝大門１丁目３番２号
(72)発明者　上野　篤志
神奈川県藤沢市桐原町８番地　オイレス工業株式会社藤沢事業場内
(72)発明者　宮田　和幸
神奈川県藤沢市桐原町８番地　オイレス工業株式会社藤沢事業場内
(74)代理人　100098095
弁理士　高田　武志

Ｆターム(参考)　3J011 AA03 AA10 BA02 BA08 CA01
KA04 RA02 SC01
3J016 AA01 BB03

(54)【発明の名称】　合成樹脂製の滑り軸受

(57)【要約】
【課題】　シール手段によって、摺動面への塵埃等の侵入を確実に防止し得て、塵埃等の侵入に起因する摺動特性の低下を生じさせることがなく、しかも、振動等によって容易に脱落しないようにシール手段を装着でき、而して、ステアリング操作時の円滑な操舵を長期間にわたって維持できる合成樹脂製の滑り軸受を得ること。
【解決手段】　合成樹脂製の滑り軸受１は、合成樹脂製の下部ケース２と、下部ケース２に重ねられた合成樹脂製の上部ケース３と、上部及び下部ケース２及び３間の空間８に配された合成樹脂製の滑り軸受手段４と、下部ケース２の外面５を覆って配されており、両環状の端部６及び７で上部及び下部ケース２及び３間の空間８の外側及び内側環状開口９及び１０を閉塞した弾性シール手段１１とを具備している。



【特許請求の範囲】
【請求項１】　合成樹脂製の下部ケースと、この下部ケースに重ねられた合成樹脂製の上部ケースと、上部及び下部ケース間に配された合成樹脂製の滑り軸受手段と、下部ケースの外面を覆って配されており、両環状の端部で下部及び上部ケース間の空間の外側及び内側環状開口を閉塞した弾性シール手段とを具備している合成樹脂製の滑り軸受。
【請求項２】　下部ケースは、円筒状の内周面を有した筒部と、この筒部の一端部に一体的に形成された第一の環状板部とを備えており、上部ケースは、下部ケースの筒部の内周面と同心な内周面及び外周面を有して、下部ケースの筒部内に配された内側円筒部と、この内側円筒部の一端部に一体的に形成された第二の環状板部と、この第二の環状板部の環状外周端部に一体的に形成されており、下部ケースの筒部の内周面と同心な内周面を有した外側円筒部とを具備しており、弾性シール手段は、下部ケースの筒部の外周面及びこの外周面に連接する環状端面並びに第一の環状板部の環状外側面及びこの環状外側面に連接する環状端面を覆った本体部と、この本体部の外側一端部に一体的に形成されており、外側環状開口を閉塞する外側弾性リップ部と、本体部の内側一端部に一体的に形成されており、内側環状開口を閉塞する内側弾性リップ部とを具備している請求項１に記載の合成樹脂製の滑り軸受。
【請求項３】　滑り軸受手段は、下部ケースの第一の環状板部と上部ケースの第二の環状板部との間に配されたスラスト滑り軸受と、下部ケースの筒部と上部ケースの内側円筒部との間に配されたラジアル滑り軸受とを備えている請求項２に記載の合成樹脂製の滑り軸受。
【請求項４】　外側弾性リップ部は、その環状の外側一端部で、上部ケースの外側円筒部に弾性的に接触しており、内側弾性リップ部は、その環状の内側一端部で上部ケースの内側円筒部に弾性的に接触している請求項２又は３に記載の合成樹脂製の滑り軸受。
【請求項５】　弾性シール手段において、本体部は、心金部材を具備しており、外側及び内側弾性リップ部の夫々は、弾性材からなる請求項２から４のいずれか一項に記載の合成樹脂製の滑り軸受。
【請求項６】　心金部材は、下部ケースの筒部の外周面及び環状端面並びに第一の環状板部の環状外側面及び環状端面を覆って伸びて、弾性材に被覆されており、外側及び内側弾性リップ部の夫々の弾性材は、心金部材を被覆した弾性材から伸びて当該弾性材と一体的になっている請求項５に記載の合成樹脂製の滑り軸受。
【請求項７】　滑り軸受手段は、下部ケース及び上部ケースの少なくとも一方に一体的に形成されている請求項１から６のいずれか一項に記載の合成樹脂製の滑り軸受。
【請求項８】　滑り軸受手段は、下部ケース及び上部ケースに対して別体に形成されている請求項１から６のいずれか一項に記載の合成樹脂製の滑り軸受。
【請求項９】　滑り軸受手段には、グリース溜めが形成されている請求項１から８のいずれか一項に記載の合成樹脂製の滑り軸受。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、合成樹脂製の滑り軸受に関し、更に詳しくは四輪自動車におけるストラット型サスペンション（マクファーソン式）に組込まれて好適な合成樹脂製の滑り軸受に関する。
【０００２】
【発明が解決しようとする課題】四輪自動車の前輪に用いられるストラット型サスペンションは、一般に、主軸と一体的となった外筒の中に油圧式ショックアブソーバを内蔵したストラットアッセンブリにコイルバネを組合わせた構造をもっている。斯かるサスペンションにおいては、ステアリング操作においてストラットアッセンブリがコイルバネと共に回る際に、ストラットアッセンブリのピストンロッドが回る形式と、ピストンロッドが回らない形式のものがあるが、いずれの形式においてもストラットアッセンブリの回動を円滑に許容するべく、車体の取付部材とコイルバネの上部バネ座シートとの間に、転がり玉軸受に代えて、合成樹脂製の滑り軸受が使用される場合がある。
【０００３】合成樹脂製の滑り軸受は、通常、合成樹脂製の下部ケースと、この下部ケースに重ねられた合成樹脂製の上部ケースとを具備し、これら下部ケースと上部ケースとの間の空間に滑り軸受部材又は滑り軸受突部を配してなるが、この空間に塵埃、泥水等が侵入すると、所望の軸受機能が得られなくなってしまう虞がある。一方、ストラット型サスペンションは、車輌走行中に塵埃、泥水などが直接作用する部位に装着されるため、車体の取付部材とコイルバネの上部バネ座シートとの間に装着される滑り軸受の使用環境も極めて過酷なものとなる。したがって、滑り軸受部材又は滑り軸受突部が配された空間の外周側及び内周側が直接外部に開口していると、ここからの塵埃、泥水などの空間への侵入の危険が極めて高くなり、ここでの密封性が極めて重要になる。特に、空間での水分等の滞留を防止するために、空間の内周側を下方に開口させて下部ケース及び上部ケースを形成した合成樹脂製の滑り軸受では、上記の危険がますます高くなる。
【０００４】加えて、合成樹脂製の滑り軸受は、上記のように自動車の前輪等のきわめて振動の激しい部位に装着されるために、塵埃、泥水等の空間への侵入を防止するために当該空間の開口部を閉塞するシール手段に対しては、振動等によって容易に脱落しないように、それがしっかりと空間の開口部に装着されることが要求される。

【０００５】本発明は、前記諸点に鑑みてなされたものであって、シール手段によって、摺動面への塵埃等の侵入を確実に防止し得て、塵埃等の侵入に起因する摺動特性の低下を生じさせることがなく、しかも、振動等によって容易に脱落しないようにシール手段を装着でき、而して、ステアリング操作時の円滑な操舵を長期間にわたって維持できる合成樹脂製の滑り軸受を得ることを目的とするものである。

【０００６】

【課題を解決するための手段】本発明の第一の態様の合成樹脂製の滑り軸受は、合成樹脂製の下部ケースと、この下部ケースに重ねられた合成樹脂製の上部ケースと、上部及び下部ケース間に配された合成樹脂製の滑り軸受手段と、下部ケースの外面を覆って配されており、両環状の端部で下部及び上部ケース間の空間の外側及び内側環状開口を閉塞した弾性シール手段とを具備している。

【０００７】第一の態様の滑り軸受によれば、両環状の端部で上部及び下部ケース間の空間の外側及び内側環状開口を閉塞する弾性シール手段が下部ケースの外周面を覆って配されているために、滑り軸受が車体の取付部材とコイルバネの上部バネ座シートとの間に取付けられると、弾性シール手段が上部バネ座シート又は上部バネ座シート上に設置される座金にしっかりと固定される結果、弾性シール手段の脱落を確実に防止でき、しかも、当該弾性シール手段によって、摺動面への塵埃等の侵入を確実に防止し得て、塵埃等の侵入に起因する摺動特性の低下を生じさせることがなく、而して、ステアリング操作時の円滑な操舵を長期間にわたって維持できる。

【０００８】本発明の第二の態様の合成樹脂製の滑り軸受では、第一の態様の滑り軸受において、下部ケースは、円筒状の内周面を有した筒部と、この筒部の一端部に一体的に形成された第一の環状板部とを備えており、上部ケースは、下部ケースの筒部の内周面と同心な内周面及び外周面を有して、下部ケースの筒部内に配された内側円筒部と、この内側円筒部の一端部に一体的に形成された第二の環状板部と、この第二の環状板部の環状外周端部に一体的に形成されており、下部ケースの筒部の内周面と同心な内周面を有した外側円筒部とを具備しており、弾性シール手段は、下部ケースの筒部の外周面及びこの外周面に連接する環状端面並びに第一の環状板部の環状外側面及びこの環状外側面に連接する環状端面を覆った本体部と、この本体部の外側一端部に一体的に形成されており、外側環状開口を閉塞する外側弾性リップ部と、本体部の内側一端部に一体的に形成されており、内側環状開口を閉塞する内側弾性リップ部とを具備している。

【０００９】第二の態様の滑り軸受によれば、下部ケースの筒部の外周面及び環状端面並びに第一の環状板部の環状外側面及び環状端面を覆った本体部の内側及び外側一端部に環状の内側及び外側弾性リップ部が形成されているために、この内側及び外側弾性リップ部の上部ケースの内側及び外側円筒部への弾性的な接触により、外側及び内側環状開口の密封をほぼ完全にできる。

【００１０】本発明の第三の態様の合成樹脂製の滑り軸受では、第二の態様の滑り軸受において、滑り軸受手段は、下部ケースの第一の環状板部と上部ケースの第二の環状板部との間に配されたスラスト滑り軸受と、下部ケースの筒部と上部ケースの内側円筒部との間に配されたラジアル滑り軸受とを備えている。

【００１１】第三の態様の滑り軸受において、スラスト滑り軸受は、第一の環状板部及び第二の環状板部のうちの少なくとも一方に一体的に形成しても、これに代えて、それらのうちの少なくとも一方に対して別体に形成してもよく、ラジアル滑り軸受も同様に、筒部及び内側円筒部のうちの少なくとも一方に一体的に形成しても、これに代えて、それらのうちの少なくとも一方に対して別体に形成してもよい。

【００１２】本発明の第四の態様の合成樹脂製の滑り軸受では、第二又は第三の態様の滑り軸受において、外側弾性リップ部は、その環状の外側一端部で、上部ケースの外側円筒部に弾性的に接触しており、内側弾性リップ部は、その環状の内側一端部で上部ケースの内側円筒部に弾性的に接触している。

【００１３】本発明の第五の態様の合成樹脂製の滑り軸受では、第二から第四のいずれかの態様の滑り軸受において、弾性シール手段の本体部は、心金部材を具備しており、弾性シール手段の外側及び内側弾性リップ部の夫々は、弾性材からなっている。

【００１４】本発明の第六の態様の合成樹脂製の滑り軸受では、第五の態様の滑り軸受において、心金部材は、下部ケースの筒部の外周面及び環状端面並びに第一の環状板部の環状外側面及び環状端面を覆って伸びて、弾性材に被覆されており、外側及び内側弾性リップ部の夫々の弾性材は、心金部材を被覆した弾性材から伸びて当該弾性材と一体的になっている。

【００１５】本発明の第五の態様の滑り軸受では、弾性シール手段が心金部材を具備し、外側及び内側弾性リップ部が弾性材からなり、第六の態様の滑り軸受では、下部ケースの外面を覆った心金部材が弾性材で被覆されて、外側及び内側弾性リップ部の夫々が心金部材を被覆した弾性材から一体的に延長された弾性材からなるために、弾性シール手段を下部ケースの外面に垂れることなしに配置でき、しかも、弾性材からなる外側及び内側弾性リップ部でもって外側及び内側環状開口の密封をほぼ完全に達成できる。弾性材としては、天然ゴム、合成ゴムなどのゴム弾性体あるいはポリエステル、ポリウレタンなどのプラスチックエラストマーが使用される。

【００１６】本発明では、滑り軸受手段を、第七の態様の滑り軸受のように、下部ケース及び上部ケースの少なくとも一方に一体的に形成して設けても、第八の態様の

滑り軸受のように、下部ケース及び上部ケースに対して別体に形成して設けてもよく、ここで、滑り軸受手段を、スラスト滑り軸受とラジアル滑り軸受とから構成する場合には、第三の態様のように、これらをも下部ケース及び上部ケースの少なくとも一方に一体的に形成又は別体に形成して設けてよい。更に、滑り軸受手段には、第九の態様の滑り軸受のように、グリース溜めを形成してもよく、このグリース溜めにグリースを配して用いると、ステアリング操作時の更なる円滑な操舵を長期に亘って得ることができる。

【００１７】本発明における上部及び下部ケースを構成する合成樹脂は、耐摩耗性、耐衝撃性、耐クリープ性等の摺動特性及び機械的特性に優れていることが好ましく、また上部及び下部ケース間に配される滑り軸受手段を構成する合成樹脂は特に自己潤滑性を有することが好ましく、例えばポリアセタール樹脂、ポリアミド樹脂、ポリブチレンテレフタレート（ＰＢＴ）等のポリエステル樹脂、ポリエチレン、ポリプロピレン等のポリオレフィン樹脂等が良好に使用され、このほかポリカーボネート樹脂等も使用し得る。

【００１８】上部及び下部ケースには、滑り軸受手段を構成する合成樹脂と同様の合成樹脂が使用され得るが、特に滑り軸受手段に使用される合成樹脂と摩擦特性の良好な組合わせであって、しかも比較的剛性の高い合成樹脂であることが望ましい。その望ましい組合わせについて例示すると、滑り軸受手段と上部及び下部ケースとに対して、ポリアセタールとポリアミドとの組み合わせ、ポリエチレンとポリアセタールとの組み合わせ、ポリアセタールとＰＢＴとの組み合わせ及びポリアセタールとポリアセタールとの組み合わせがある。

【００１９】なお、外側及び内側環状開口の少なくとも一方に、ラビリンスシール手段を更に設けて、このラビリンスシール手段と弾性シール手段との協同により、外周側及び内周側の少なくとも一方の密封性を更に向上させてもよい。

【００２０】次に本発明を、図に示す好ましい実施の形態の例に基づいて更に詳細に説明する。本発明はこれら例に何等限定されないのである。

【００２１】

【実施の形態】図１から図４において、本例の合成樹脂製の滑り軸受１は、合成樹脂製の下部ケース２と、下部ケース２に重ねられた合成樹脂製の上部ケース３と、上部及び下部ケース２及び３間の空間８に配された合成樹脂製の滑り軸受手段４と、下部ケース２の外面５を覆って配されており、両環状の端部６及び７で上部及び下部ケース２及び３間の空間８の外側及び内側環状開口９及び１０を閉塞した弾性シール手段１１とを具備している。

【００２２】下部ケースは２、円筒状の内周面１５を有した筒部１６と、筒部１６の一端部に一体的に形成された環状板部１７とを備えている。

【００２３】上部ケース３は、下部ケース２の筒部１６の内周面１５と同心な内周面２２及び外周面２３を有して、下部ケース２の筒部１６内に配された内側円筒部２４と、内側円筒部２４の一端部に一体的に形成された環状板部２５と、環状板部２５の環状外周部に一体的に形成されており、下部ケース２の筒部１６の内周面１５と同心な内周面２６を有した外側円筒部２７と、外側円筒部２７の内周面２６に、径方向内方に突出して一体的に形成された環状突起２８とを備えている。

【００２４】内側円筒部２４は、厚肉円筒部３１と薄肉円筒部３２とからなり、外周面２３は、厚肉円筒部３１の外周面３３と薄肉円筒部３２の外周面３４とからなる。内側円筒部２４の内周面２２は、図５に示すストラットアッセンブリのピストンロッド３６が挿着される挿通孔３７を規定している。

【００２５】滑り軸受手段４は、下部ケース２の環状板部１７と上部ケース３の環状板部２５との間に配されて、環状板部１７の環状内側面４１に、軸方向に突出して一体的に形成された環状のスラスト滑り軸受４２と、下部ケース２の筒部１６と上部ケース３の内側円筒部２４との間に配されて、筒部１６の内周面１５に、径方向内方向に突出して一体的に形成された円筒状のラジアル滑り軸受４４とを備えており、スラスト滑り軸受４２の突出環状面４５は、環状板部２５の一方の環状の側面（環状内面）４６に摺動自在となるように接触しており、ラジアル滑り軸受４４の円筒状の突出円筒面４７は、厚肉円筒部３１の円筒状の外周面３３に摺動自在となるように接触している。

【００２６】滑り軸受手段４において、突出環状面４５には、放射方向に伸びるグリース溜めとしての複数本の溝４８が、突出円筒面４７には、軸方向に伸びる同じくグリース溜めとしての複数本の溝４９が夫々角度方向に等間隔に形成されている。

【００２７】弾性シール手段１１は、下部ケース２の筒部１６の円筒状の外周面５１及び外周面５１に連接する環状端面５２並びに環状板部１７の環状外側面５３及び環状外側面５３に連接する環状端面５４を覆った本体部５５と、外側環状開口９を閉塞するように、本体部５５の環状の外側一端部５６から折り返されて徐々に拡径して伸びて、環状の外側一端部である先端５７が外側円筒部２７の内周面２６に弾性的に接触しており、本体部５５と同軸であって本体部５５の外側一端部５６に一体的に形成されて、環状の端部６を構成する環状の外側弾性リップ部５８と、内側環状開口１０を閉塞するように、本体部５５の環状の内側一端部５９から折り返されて徐々に縮径して伸びて、環状の内側一端部である先端６０が薄肉円筒部３２の外周面３４に弾性的に接触しており、本体部５５と同軸であって本体部５５の内側一端部５９に一体的に形成されて、環状の端部７を構成する環

状の内側弾性リップ部６１とを具備している。

【００２８】弾性シール手段１１において、本体部５５は、心金部材６５とゴムあるいはプラスチックエラストマーからなる弾性材６６とを具備しており、外側及び内側弾性リップ部５８及び６１は、ゴムあるいはプラスチックエラストマーからなる弾性材からなり、心金部材６５は、下部ケース２の外面５である筒部１６の外周面５１及び環状端面５２並びに環状板部１７の環状外側面５３及び環状端面５４を覆って且つこれらに接触して伸びて、弾性材６６に被覆されており、外側及び内側弾性リップ部５８及び６１の弾性材は、心金部材６６を被覆した弾性材６６から伸びて当該弾性材６６と一体的になっている。外側及び内側弾性リップ部５８及び６１の夫々は、先端に向かうに従って厚肉となるように形成されている。

【００２９】以上の合成樹脂製の滑り軸受１は、図５に示すように、ストラットアッセンブリにおけるショックアブソーバのピストンロッド３６を挿通孔３７に挿通させ、上部ケース３の上面７１を、ピストンロッド３６の一端が取り付けられる車体側の取付部材７２にぴったりと当接させ、弾性シール手段１１の円筒状外面７３及び環状外面７４を、ストラットアッセンブリにおけるコイルバネ７５の上部バネ座シート７６に座金７７を介してぴったりと当接させて、取付部材７２と上部バネ座シート７６との間に装着されて用いられる。

【００３０】ステアリング操作によりストラットアッセンブリが回動されると、上部ケース３に対して下部ケース２が回転され、下部ケース２のこの回転は、上部及び下部ケース３及び２間に配されたスラスト滑り軸受４２及びラジアル滑り軸受４４により滑らかになされ、したがってステアリング操作も抵抗なく行われる。また、上部及び下部ケース３及び２間の空間８への外側及び内側環状開口９及び１０を介する塵埃等の侵入は、外周側では外側弾性リップ部５８により、内周側では内側弾性リップ部６１により防止され、而してスラスト滑り軸受４２及びラジアル滑り軸受４４の各摺動面間である突出環状面４５と側面４６との間及び突出円筒面４７と外周面３３との間への塵埃等の侵入が確実に防止される。

【００３１】すなわち、合成樹脂製の滑り軸受１によれば、両環状の端部６及び７で上部及び下部ケース３及び２間の空間８の外側及び内側環状開口９及び１０を閉塞する弾性シール手段１１が下部ケース２の外面５である外周面５１、環状端面５２、環状外側面５３及び環状端面５４を覆って配されているために、滑り軸受１が車体の取付部材７２とコイルバネ７５の上部バネ座シート７６との間に取付けられると、弾性シール手段１１が上部バネ座シート７６又は上部バネ座シート７６上に設置される座金７７にしっかりと固定される結果、弾性シール手段１１の脱落を確実に防止でき、しかも、当該シール手段１１によって、スラスト滑り軸受４２及びラジアル滑り軸受４４における突出環状面４５と側面４６との間及び突出円筒面４７と外周面３３との間への塵埃等の侵入を確実に防止し得て、塵埃等の侵入に起因する摺動特性の低下を生じさせることがなく、而して、ステアリング操作時の円滑な操舵を長期間にわたって維持できる。

【００３２】また滑り軸受１によれば、筒部１６の外周面５１及び環状端面５２並びに環状板部１７の環状外側面５３及び環状端面５４を覆った本体部５５の内側及び外側一端部５９及び５６に環状の内側及び外側弾性リップ部６１及び５８が形成されているために、内側及び外側弾性リップ部６１及び５８の上部ケース３の内側及び外側円筒部２４及び２７への弾性的な接触により、内側及び外側環状開口１０及び９の密封をほぼ完全にできる。

【００３３】加えて滑り軸受１では、弾性シール手段１１が心金部材６５を具備し、外側及び内側弾性リップ部５８及び６１が弾性材からなり、下部ケース２の外面５を覆った心金部材６５が弾性材６６で被覆されて、外側及び内側弾性リップ部５８及び６１が心金部材６５を被覆した弾性材６６から一体的に延長された弾性材からなるために、弾性シール手段１１を下部ケース２の外面５から垂れることなしに配置でき、しかも、弾性材からなる外側及び内側弾性リップ部５８及び６１でもって密封をほぼ完全に達成できる。更に滑り軸受１では、グリース溜めとしての溝４８及び４９が形成されているために、溝４８及び４９にグリースを配して用いると、ステアリング操作時の更なる円滑な操舵を長期に亘って得ることができる。

【００３４】ところで上記の滑り軸受１では、滑り軸受手段４を下部ケース２に一体的に形成したが、これに代えて、図６及び図７に示すように滑り軸受手段４を下部ケース２及び上部ケース３に対して別体に形成してもよい。すなわち図６及び図７に示す滑り軸受１は、下部ケース２及び上部ケース３に対して別体に形成された滑り軸受手段４を具備しており、合成樹脂製の軸受手段４は、スラスト滑り軸受となる環状のスラスト滑り軸受部８１と、スラスト滑り軸受部８１に一体的に形成されたラジアル滑り軸受となる円筒状のラジアル滑り軸受部８２とを具備しており、スラスト滑り軸受部８１の一方の環状の側面８３には、溝４６と同様の複数の溝８４と、溝８４の一端を夫々連通した環状の溝８５とが形成されており、スラスト滑り軸受部８１の他方の環状の側面８６にも、同様の溝８４と、溝８４の一端を夫々連通した環状の溝８５とが形成されており、ラジアル滑り軸受部８２の内外周面８７及び８８には、溝４９と同様の複数の溝８９及び９０が形成されており、滑り軸受手段４は、スラスト滑り軸受部８１の側面８３が環状板部２５の側面４６に、スラスト滑り軸受部８１の側面８６が環状板部１７の環状内側面４１に夫々摺動自在となるように接触し、ラジアル滑り軸受部８２の内周面８７が厚肉

円筒部３１の外周面３３に、ラジアル滑り軸受部８２の外周面８８が筒部１６の内周面１５に夫々摺動自在となるように接触して、下部ケース２及び上部ケース３との間の空間８に配されている。

【００３５】図６及び図７に示すような滑り軸受手段４を具備した滑り軸受１でも、図１から図４で示される滑り軸受１と同様な効果を得ることができる。

【００３６】

【発明の効果】本発明によれば、シール手段によって、摺動面への塵埃等の侵入を確実に防止し得て、塵埃等の侵入に起因する摺動特性の低下を生じさせることがなく、しかも、振動等によって容易に脱落しないようにシール手段を装着でき、而して、ステアリング操作時の円滑な操舵を長期間にわたって維持できる合成樹脂製の滑り軸受を提供できる。

【図面の簡単な説明】

【図１】本発明の好ましい実施の形態の一例の断面図である。

【図２】図１に示す例の一部拡大断面図である。

【図３】図１に示す例の弾性シール手段の拡大断面図である。

【図４】図１に示す例の下部ケースと滑り軸受手段との斜視図である。

【図５】図１に示す例をストラットアッセンブリに用いた例の断面図である。

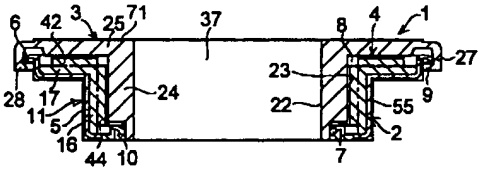
【図６】本発明の好ましい実施の形態の他の例の断面図である。

【図７】図６に示す滑り軸受手段の斜視図である。

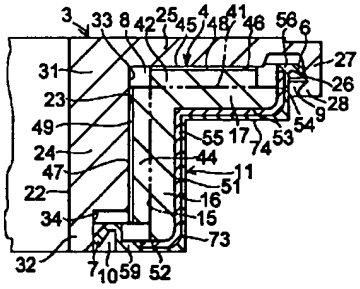
【符号の説明】

１　合成樹脂製の滑り軸受
２　下部ケース
３　上部ケース
４　滑り軸受手段
８　空間
９　外側環状開口
１０　内側環状開口
１１　弾性シール手段

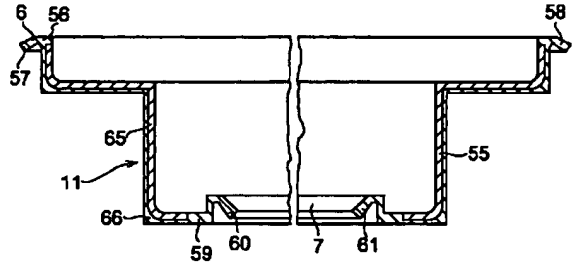
【図１】



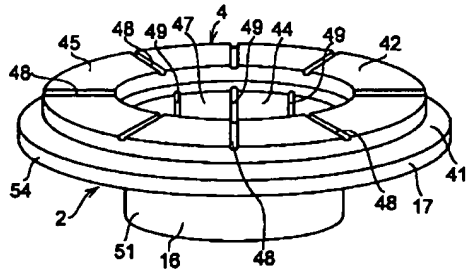
【図２】



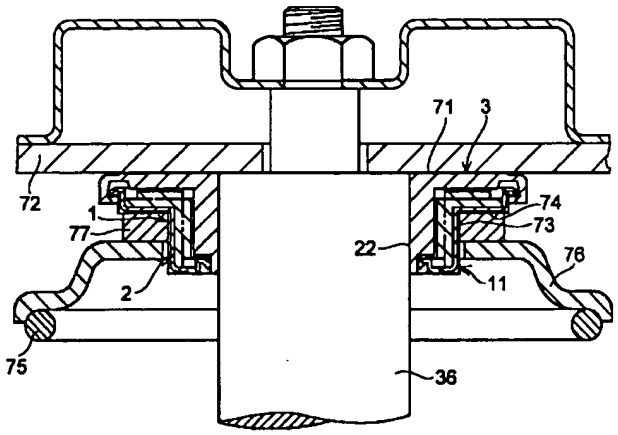
【図３】



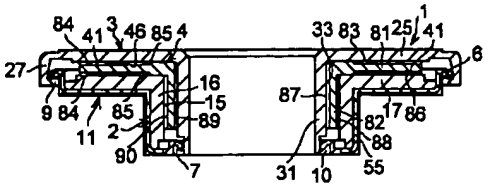
【図４】



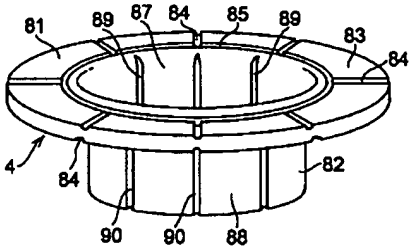
【図5】


71
3
72
1
77
74
73
22
76
2
11
75
36

【図6】


84
41
3
46
85
4
33
83
81
25
1
41
6
27
16
15
89
87
9
84
85
11
2
90
7
82
17
86
88
31
10
55

【図7】


81
89
87
84
85
89
83
84
4
84
82
90
90
88